Center Independent Research & Development: GRC IRAD

FY17 GRC: TREES - Thermal Recovery Energy Efficient System

Completed Technology Project (2017 - 2017)

Project Introduction

This project will transform how waste heat is managed on aircraft by successfully demonstrating a novel NASA patent-pending aircraft waste heat recovery and recycling system. The objective is to remove low grade waste heat that is generated throughout high power composite body aircraft while improving overall vehicle performance.

Anticipated Benefits

Electric aircraft, small core turbofans, etc., are increasingly limited in performance due to thermal management challenges. The benefits that could result in 5 to 10 years are up to 16% fuel burn benefit in transport aircraft and it enables a new class of high power electric aircraft propulsion within 10 to 20 years. Additionally, other new classes of aircraft become possible by incorporating integrated small core, tail cone thruster, laminar flow control, and high voltage powertrain for system mass, noise, emissions, and fuel reduction for single-aisle and larger aircraft.

Primary U.S. Work Locations and Key Partners

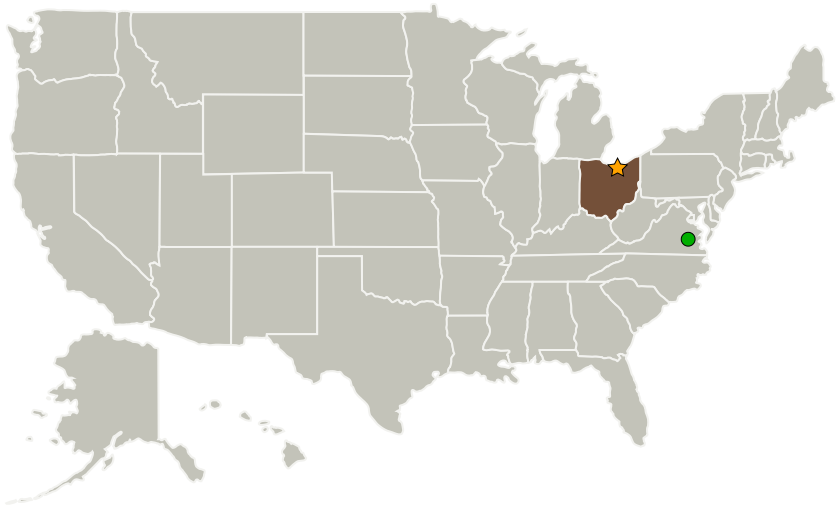

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Table of Contents

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Organizations Performing Work	Role	Type	Location
Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Air Force Research Laboratory(AFRL)	Supporting Organization	US Government	Notre Dame, Indiana
GE Aviation	Supporting Organization	Industry	Cincinnati, Ohio
GE Global Research	Supporting Organization	Industry	Niskayuna, New York
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations
Ohio

Project Transitions

May 2017: Project Start

November 2017: Closed out

Closeout Summary: GRC considers this technology to be ready for adoption wi thin the Aeronautics program/project portfolio. The GRC Aeronautics Directorate will support the accomplishment of this objective.

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Center Independent Research & Development: GRC IRAD

Project Management

Program Manager:

Gary A Horsham

Project Manager:

Rodger W Dyson

Principal Investigator:

Rodger W Dyson

Co-Investigators:

David E Ashpis
Ralph H Jansen
Albert J Juhasz
Gerald M Hill

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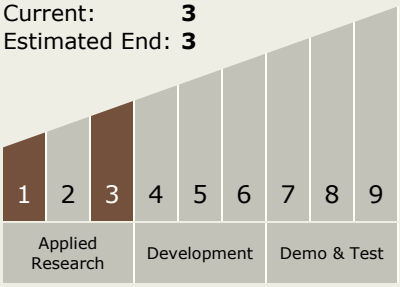
Completed Technology Project (2017 - 2017)

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors

Target Destinations

Earth, The Moon, Mars

Supported Mission Type

Planned Mission (Pull)